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Claims:

1. A method of determining the degree of lung inspiration in a patient comprising the step of non-invasively detecting the position of the patient's diaphragm.

2. A method as claimed in claim 1, wherein the diaphragm position is used as a reference point to define the degree of lung inspiration when an image of the patient is generated and further comprising the step of reproducing that degree of lung inspiration in order to perform a medical or surgical procedure on the patient based on that image.

3. A method as claimed in claim 2, wherein diaphragm position is first determined whilst the patient holds his breath and images are generated simultaneously therewith, the degree of lung inspiration subsequently being reproduced by the patient inhaling or inhaling and exhaling until the previously determined diaphragm position is achieved and the desired procedure being then carried out whilst the patient holds his breath.

4. A method as claimed in any preceding claim, wherein the diaphragm position is determined by means of ultrasound.

5. A method as claimed in any preceding claim, comprising providing an array of ultrasound transducer elements on the patient extending over the lung sinus, wherein the position of the diaphragm is determined based upon the signals received by the individual transducer elements.

6. A method as claimed in claim 5, wherein the array

of ultrasound transducer elements is placed on the patient's lower chest and/or upper abdomen and is moved into a desired position over the lung sinus using feedback from the ultrasound transducer elements.

7. An apparatus for monitoring the position of a patient's diaphragm comprising an array of ultrasound transducer elements for placing on the patient to extend over the lung sinus, wherein the position of the diaphragm may be determined based upon signals received by the individual transducer elements.

8. An apparatus as claimed in claim 7, wherein the array of transducer elements is a one-dimensional array in the direction of the longitudinal (z) axis of the patient.

9. An apparatus as claimed in any of claims 6 to 8, wherein the measured acoustic impedance from each transducer element is used as an input to a processor and acoustic impedance may be processed to provide a function that varies with the movement of the diaphragm in the z-direction.

10. A method of performing a biopsy using the method or apparatus of any preceding claim.

11. A method of radiotherapy comprising providing a source of radiation and directing it at a target area of a patient, wherein the emission of the radiation beam is triggered by means of an apparatus according to any of claims 7 to 9.

12. A method of radiotherapy comprising providing a source of radiation and directing it at a target area of a patient, wherein the emission of the radiation beam may be controlled to follow the movement of the target

based on the position of the diaphragm as determined by the method or apparatus of any of claims 1 to 9.

13. A radiotherapy apparatus comprising a radiation source and a control unit, the source being mounted on a tracking device and being controlled by a control unit to direct the radiation towards the calculated position of the tumor based on the current measurement of diaphragm position obtained by the method or apparatus of any of claims 1 to 9.

14. A method of monitoring respiration by monitoring the movement of a patient's diaphragm using the method or apparatus of any of claims 1 to 9.

15. A method of determining the degree of lung inspiration of a patient substantially as herein described with reference to the accompanying drawings.

16. An apparatus for monitoring the position of a patient's diaphragm substantially as herein described with reference to the accompanying drawings.